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Opinions expressed by authors in this magazine are not necessarily those of the Association.

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The reformer has enemies among those who profit by the old order

Edmund G. Benser

► Under the stimulus provided by Frederick Taylor, industrial engineers moved into the business systems field in the guise of so-called "efficiency experts." After all, if you could hold a stopwatch on a machine, there seemed to be no good reason why you could not hold one on a human being. However, the day of the efficiency expert was short. The engineers were awkward in the business systems field. They caused irritation. They failed to recognize the ingenuity of the human mind in finding ways to defeat time studies. Stopwatch efficiency measurements became the subject of ridicule because of the silly applications which were subjected to this process.

Evolution

As business expanded, paperwork increased. As government expanded, the need for more statistical data increased. Numerous so-called "time-saving devices" came into being. The theories of the efficiency expert were applied in part to business machines because they could not talk back. Forms design also received a tremendous impetus.

Many young people seeking a way to move forward in business administration seized upon the elements of form design as a means. The trick was to design forms which would permit more efficient utilization. Even the number of typewriter strokes used to complete a form became important. During this period, most systems efforts in business were devoted to perfecting a particular specific operation. At this time, systems work could hardly be identified as a profession. This situation continued until a relatively short time ago. Oh, it's true that companies grew; the number of people engaged in clerical effort increased; and the number of people designing forms and installing various labor-saving devices increased; but nothing really happened as far as improving or developing systems work at a professional level.

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The Last Decade

A little over ten years ago, however, a few systems men decided that the time was ripe to create an organization which, it was hoped, would clarify the status of business systems work and which would provide a focal point for the collective and cooperative efforts of persons in systems work. After a number of false starts, the Systems & Procedures Association was founded, June 30, 1947.

At about the same time, thoughtful men were developing electronic computers. The first computer came into existence during the period 1937-1944 as a result of work performed by Professor Howard Aiken of Harvard University.

Little was done commercially with electronic computers until 1952, at which time the market was approximately $10 million. During the next four years, from 1952 to 1956, some 1,100 computers were installed. In 1957 approximately 1,300 business computers were installed, more than during all previous years. In 1957 the market for computers grew to approximately $350 million. Installations included about 80 large-scale computers, each representing an investment of more than $1 million.

The Current Emphasis

The banding together of men in the systems field and the somewhat concurrent development of electronic computers was coincidental. It may have resulted from the common knowledge that our economic system was expanding more rapidly than at any previous time and that there was a need to prepare for the expansion. Oddly enough, there is not too close a relationship today between the developers of electronic equipment and those who are responsible for developing the systems which will use these tools. And, also oddly enough, both groups have failed to some extent to grasp the real significance of what is happening.

In other words, the developers of equipment are thinking primarily about the equipment and how it stacks up competitively. Systems men, on the other hand, are working with the details of specific operating applications; whereas, the main problem exists at the top and broad level of the over-all management of our economy.

This may sound like a harsh indictment of systems men, but we are fact to fact with a situation where responsible individuals are publicly criticizing, by implication at least, the efforts of systems men in the new field of electronic data processing in business. Recently at a meeting in New York City of approximately 300 men who hold top-level financial positions, a speaker said that he had recently conducted an extensive survey of computer applications and that, "at least two-thirds of the 300 companies studied were disappointed with the results obtained by the use of a computer." He then spoke, in critical terms, of " the inadequate systems approach." Decisions about computer installations, he said, should not be based upon estimates of clerical savings alone.

The Origins of Professions

In business systems, one of the oldest of computing devices is the 2,000-year-old abacus, which incidentally, is still in use. Today it is a convenient tool for demonstrating how an electronic computer works. Tabulating equipment grew from a seed sowed 150 years ago in the invention of Joseph Marie Jacquard in an automatic loom which had the ability to store instructions prepared ahead of time as a series of holes punched into a long paper tape, thereby permitting the weaving of complicated patterns.

In almost every professional group, some particular situation arose which resulted in the attainment of professional status. In some cases it literally took thousands of years. Record keeping in some form or other has existed since human life began, but it was not until 1854 that the accounting profession obtained recognition in Great Britain. Civil engineering was practiced from the first time a log was placed across a stream of water to provide a way of reaching the other side. But nothing happened to identify engineering as a profession until the Industrial Revolution.

The medical profession went up and down for thousands of years. In fact, after the fall of Ancient Greece, much of the medical art was lost for centuries. Surgeons, because they worked with their hands, were assigned a low social status. They practiced medicine as a part-time art while earning a living at such a practical activity as cutting hair. Not until the fourteenth century did the barriers start to break down. In fact, it was not until the nineteenth century, with developments by Pasteur and Lister, the introduction of antiseptic methods, and the beginning of the science of bacteriology, that medicine began to be recognized as a profession.

The Systems Profession

Systems men today have a tremendous opportunity to establish a systems profession. Why is this true? To begin with, the last ten years of growth in our national economy have created a need for people who have the knowledge, ability, time, and courage to advise management about the methods which will prove most productive in processing paperwork that is basic to management decisions. Secondly, electronic computers have been heralded as a tool that will solve the data-processing problems of business provided that men can be found who have enough vision and knowledge to put them to useful work—management decision making work. In one organization all jobs that had been converted to machine language were carefully evaluated when it was first decided to install a card-operated magnetic drum data-processing machine. Since the company already had in operation a system which would accumulate information in usable computer form, initial operations were programmed, even before the equipment was installed.

It was concluded that successful programming consisted of about 90 percent knowledge of the business and of about 10 percent technical programming skill. It was further concluded, therefore, that a methods staff should be composed of qualified technicians in electronic equipment applications who *have* a broad and comprehensive knowledge of how the particular business operates.

The systems man occupies an enviable position in business today but he must realize that a basic part of his *value* lies in his knowledge of the broad management problems of his organization.

The Dangers Ahead

What are some of the dangers that can destroy, almost overnight, this hopeful situation?

To begin with, there are many established organizations and occupational groups that are jogging for a position in the business systems area. For example, there are numerous organizations today, including the following, that are exerting maximum effort to become more prominent in the systems field:

1. The Operations Research Society of America
2. The National Association of Machine Accountants
3. The American Management Association
4. The American Institute of Electrical Engineers
5. The American Institute of Industrial Engineers
6. The Society for the Advancement of Management
7. The American Institute of Cost Accountants

Secondly, there is the danger that the systems man may lack the vision he needs. Many systems men have been beaten down over the years. Some have become confused and discouraged. They are afraid to take the initiative in making their services available to their own managements at a high level. Sometimes they are so busy designing forms that they do not take time to learn about the broad elements of their own company's management problems. They have not taken time to learn how to use the electronic tools which are now at their disposal. They have not taken time to think.

In some cases, systems men have permitted themselves to become involved in the installation of electronic computers on only a limited basis. For example, it is well known that a major portion of all business computer applications have been thus far devoted to payrolls. Why is this? Is this because the systems man hesitates to advise his management that these tools are not best used on such a limited basis? Or it is because his vision is so restricted that he cannot see or visualize the possibilities of applications on an entirely new basis in broad management areas?

The Educational Program

There is, of course, the problem of education. For several years, the Systems & Procedures Association, represented by a small group of dedicated men, has been endeavoring to establish a sound and firm educational program for the development of professional systems men, a program which will eventually result in an administrative systems degree. This group of dedicated men has developed course outlines as a result of educators' round tables which have been held at the last few International Systems Meetings. Participants in these round-table discussions have been top-level educators from the major colleges and universities.

Efforts are now directed toward developing a Systems Institute to be sponsored by SPA at one of the major universities. All of these educational programs are of great importance to systems men. It is imperative that they be supported by systems men everywhere.

The Summary

To a large extent, the success or failure of our efforts to obtain professional status rest in the following:

1. We must believe in our own ability to contribute new creative effort in the development of our country and its economic progress.

2. We must study and learn and stay in the front in the application and utilization, on a sound basis, of each new data processing device as it becomes available for business use.

3. We must strengthen our positions in our respective companies by broadening our outlooks, by learning all we can about our companies' business problems, and by making our services available in any and all phases of our companies' administrative and management systems.

4. We should strengthen and support our own professional organization and cooperatively assist in the development of standards, professional and academic.

5. We must recognize our own particular abilities, strengthen them, and display them.

Two quotations taken from 16th and 17th century writings remind us that what we consider to be new problems are in reality not so new after all.

"Put yourself in the middle of things, to get at once at the heart of the business; most roam around in useless millings either about the edge or in the scrub of a tiresome verbosity, without striving upon the substance of the matter; they make a hundred turns about a point wearying themselves and wearying others, yet never arriving at the center of what is important; it is the product of a scattered brain that does not know how to get itself together; they spend time, and exhaust patience, over that which they should leave alone, and afterwards are short of both for what they did leave alone."[1]

"It must be considered that there is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things, for the reformer has enemies in all those who profit by the old order, this lukewarmness arising partly from fear of their adversaries, who have custom in their favor; and partly from the incredulity of mankind, who do not truly believe in anything new until they have had actual experience of it."[2] s/p/a

1. Gracian Y. Morales, Gracian, *The Art of Worldly Wisdom*, 1653, translated from the Spanish by Joseph Jacobs (New York: MacMillan, 1943)
2. Machiavelli, Niccolo, *The Prince*, 1513, translated by W. K. Marriott (New York: Dutton, 1948)

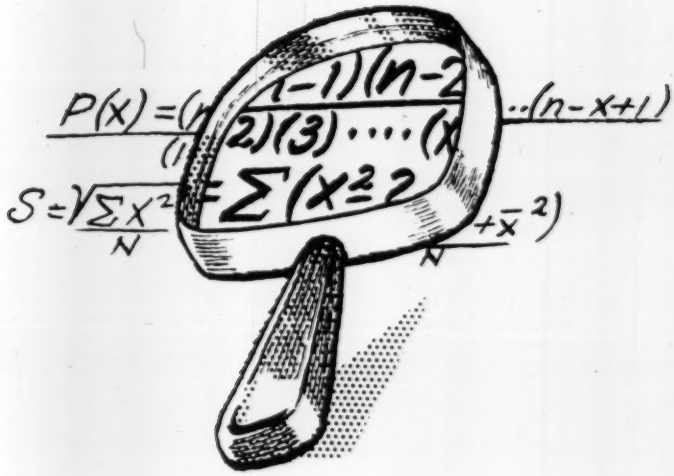
Operations As A

► A good way to begin an article about operations research is to define the term. A definition sets the stage for the reader. A difficulty is that operations research is too young to be defined authoritatively. The following tentative working definition must, however, serve our purpose:

> Operations research is the application of scientific methods, techniques, and tools to problems involving the operations of a system; to give those in control of the system a quantitative basis for decisions that will increase effectiveness in achieving objectives.

This definition emphasizes the fact that operations research is a specific tool in the business manager's kit. His tool kit also contains work simplification, flow charts, electronic computers, and techniques supplied by the systems and procedures department of companies.

Research Business Tool



H. S. Gellman, Ph. D.

Operations research has produced significant results in the short time it has been used in business. It has helped companies solve major problems of production scheduling, inventory policy, pricing, financial policy, and servicing the customers. In spite of this, I venture to say that most businessmen are still confused about what operations research is and what it can do for them. But, the businessman should not be blamed for this confusion. Much of the literature on the subject is written in a language that does not make sense to him. Most authors of articles on operations research seem to be more interested in building better tools than in discussing business problems to which these tools might apply.

The main reason operations research can be a useful tool in business is because business management is basically a rational action. The experienced businessman knows that he cannot act by "hunch" and "intuition" alone. Decisions and actions must be based upon definite facts about the business being managed. I am not trying to ignore the role that intuition plays in making decisions. Certainly, a businessman has to make some of his decisions on the basis of non-rational as well as rational facts. To some degree decision making will always be a sensitive art — a final human judgment. But the increasing use of science in management will reduce that degree. Operations research helps to define and evaluate objectively and factually the alternatives among which an executive can choose.

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Flow Charts & Mathematical Models

Now, let us look at the methods and techniques of operations research. Most practitioners agree that the following are the major phases of an operations research project:

1. Formulate the problem and identify the system involved.
2. Construct a mathematical model to represent the system symbolically (if necessary).
3. Derive a solution or solutions from the model.
4. Test the model and the solutions derived.
5. Establish controls over the solutions. Try them out experimentally.
6. Put the best solution to work.

If we compare this approach with the one used by a systems analyst (for example, in designing a new data processing system), we see many similarities. Both first formulate the problem to determine basic requirements, objectives, and system. Where the operations researcher constructs a mathematical model to represent the system under study, the systems analyst constructs a model of flow charts. Both types of model are valuable. Each has its own sphere of application. And it is usually easier to tinker and experiment with a model of a system than with an actual system.

Flow charts are one of the most powerful tools a systems analyst has at his disposal. Yet, having used flow charts and mathematical models in my work, I have concluded that the mathematical model is the more powerful of the two. Why is this so? Simply because the analysis of quantitative information is done better — more objectively — through the use of mathematical techniques.

A mathematical model is simply a system of equations which constitutes a conceptual model of the actual system, described in the language of mathematics — symbolic, impersonal, concise, objective, quantitative. For example, a mathematical equation may be written, which at its simplest, will express the way in which unit operating costs combine to determine the total cost of an operation. Other relationships may be expressed in algebraic or mathematical terms to represent the existence of certain physical or operating constraints (e.g., the maximum capacity of plant #1 is 1,000 units per month). The mathematical model may be manipulated by logical methods (addition, subtraction, integration, differentiation, etc.), and the outcome of different arrangements or changes in the model determined.

The mathematical model is basic in operations research, but it should be emphasized that mathematics is a means and not an end in operations research. Also, many problems require nothing more elaborate than a simple arithmetical or algebraic equation for which the term mathematical model seems a trifle elegant.

An Example

The following situation illustrates the actual use of a mathematical model: About four years ago Imperial Oil Limited built a central warehouse in Sarnia to handle packaged products. The Marketing Research Group in Toronto developed a plan for controlling inventory in the warehouse, and they were interested in testing their plan before putting it into operation. At that time the warehouse was not complete. The Marketing Research Group developed a mathematical model of the warehouse and the anticipated inventory control system. This model was translated

into an electronic computer program, and data representing actual orders from earlier years was fed to the computer. In this way it was possible to simulate in a few hours on the computer several years of actual warehouse operations. The results provided valuable information that helped to improve the original plan so that most of the "bugs" were removed before the plan was put into operation.

Operations Research and Systems

Let us consider the relationship between operations research and the systems function. As mentioned earlier, both functions are part of the business manager's tool kit. Both are staff functions that overlap in many areas. The author personally believes that a systems man should play a major role in the development of operations research in business. Operations research centers around new ideas for scientific analysis of business problems. It uses new tools like linear programming, mathematical statistics, and electronic computers. And, it uses new kinds of people — scientists, mathematicians, psychologists — who by tradition have not worked with problems of business management. The systems man can be the common denominator for intelligently integrating these new factors into business.

Admittedly, much of the work of operations research is of a technical nature. But in business the "technicians" needed must be expert problem-solvers more than they need to be expert mathematicians. And they need imagination more than they need equations. Most experienced experts agree that the operations researcher who has a knack for problem solving will go further than the one who relies too much on a kit of mathematical tools. When industry realizes this, a wealth of operations research talent will suddenly appear.

Perhaps many of you who would have never considered yourselves operations researchers have just the talent needed. Also, perhaps you know others in your company who have potential for operations research work. The point is, once you decide that you have the talent (and interest) it is easy to learn the techniques. Companies can help eliminate what is now an unrealistic shortage of trained workers by providing limited training to those with the maximum talent for operations research work. The time and cost required will be negligible, compared to the benefits.

Systems, A Profession

Systems, as a profession, is more than a fixed set of techniques and a specific body of knowledge. For most of us it is a field that shows tremendous promise of new applications, new skills and techniques, and continuously expanding boundaries. We, in the systems profession, can limit the scope of activity of the systems function, or we can expand it by adding new disciplines. The second choice, the choice of a dynamic systems profession, should appeal to us more than the first.

The systems man cannot afford to postpone a decision on this question. In fact, several companies have already installed or are in the process of installing electronic data processing systems without help from the "official" systems departments. Did the systems people fail to lead the way? Did they ignore EDP? This does not imply that systems men should immediately do everything they can to install EDP in their companies. In fact, many existing EDP systems should never have been installed. It does mean, however, that no systems man can offer a valid reason for not learning as much as

possible about EDP, OR, and other new tools and techniques which should logically be part of his tool kit.

Linear Programming

This is a mathematical method that juggles a number of alternative factors — all related and dependent upon each other — to find the best combination.

Applied in industry, linear programming is a technique for determining the best (optimum) allocation or use of limited resources (capital, plant capacity, advertising dollars, etc.) to achieve a selected objective (lowest cost, highest profit, greatest volume, etc.).

Linear programming assumes a linear or straight line relationship among variables. It requires that the limits of variation be fairly well established. Arithmetical computations are simple, but since they are most often used to handle a complex situation with many variables, the volume of computations is often extensive, and in many cases can best be done on an electronic computer.

Linear programming is most often applied to:

- Finding lower distribution costs (factories to warehouses).
- Better utilization of production facilities.
- Better sales planning.
- Improved price-volume relationships.
- Improved product mix.

Waiting-Line Theory

This theory, which is also called queueing theory, develops relationships involved in waiting in line — customers awaiting service, planes waiting to land, machines awaiting the repair crew, products awaiting inspection, and so forth.

Waiting-line theory is often applied to: customer service, traffic flow, facilities planning and layout, machine maintenance, and inventory control.

An outstanding example of the application of waiting-line theory was reported by the New York Port Authority in May, 1954. This involved a study of traffic delays at bridge and tunnel toll booths. More than 250 traffic officers are used to collect tolls, and payroll costs exceed $1 million annually. With all this money at stake, the authority was eager to find the level of traffic delays giving the best compromise between economy and service.

The tolls of probability theory were applied to solve the problem in quantitative terms, and an operations research team came up with what seemed to be the best relationship between traffic volumes, number of toll booths, and grade of service.

A trial was conducted at the Lincoln Tunnel. All during the week of the trial, pre-arranged schedules were followed without a hitch. At no time did excessive backups occur, and at no time did relief have to be deferred.

Monte Carlo Method

Operations research often uses what is essentially a trial-and-error method of repeated calculations to discover the best solution. This is especially true when a large number of variables is present, with interrelationships that are too complex to be handled by straightforward analytical methods.

The Monte Carlo method is often used in connection with the waiting-line theory. For example, the length of the waiting line in a supermarket will depend on the rate at which people arrive, and how many articles they buy. It also depends

on the character and skill of the cash register operator. Due to the uncertainty of the number of people who will arrive at any particular time, the operations researcher may use numbers out of a hat to simulate these arrivals — or he could spin a roulette wheel to get these random numbers. Hence the Monte Carlo method.

The Role of the Electronic Computer

While operations research is not fully dependent upon the use of computers, the characteristics of electronic computers have greatly enlarged the possibilities of operations research development. The use of computers has made it possible to tackle operations research problems heretofore impossible because of the volume of calculating effort, and has, of course, made possible greater speeds and lower costs.

These are some of the specific tools used by the operations researcher. It should be emphasized that the scientific and objective approach of operations research is far more important than specific techniques. It is easy to fall into the trap of over-emphasizing the techniques.

So far, most of the operations research work reported has been done at large companies. Smaller companies usually cannot afford the investments earmarked for research by large corporations. But the question may soon be whether smaller companies can afford not to engage in operations research. As larger companies proceed with operations research work, including the use of large-scale computers, they begin to recapture the communication and control advantages of smaller organizations. And this makes them a greater competitive threat to the smaller company.

What can the smaller companies do about it? The answer lies in keeping up with new developments — those pioneered by the large concerns. Often small companies can use scaled-down versions of the more elaborate methods. In some ways smaller companies have the advantage in using operations research. In many cases data can be obtained more easily. Everything is on a smaller scale, including the size and cost of the job to be done. Small companies probably stand to gain more from operations research than their larger competitors. Many of them are assigning someone, full or part time, to keep up with developments.

Conclusion

The systems man has an important stake in operations research. He should do everything he can to further its development as a business tool. The systems man has nothing to fear in the operations research movement. He does not have to be a Ph.D. to hold his job. On the other hand, he should not look at operations research as a great big monster that must be mastered before it can be used. Each little bit mastered week by week will immediately help him. **s/p/a**

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Rational Data Processing

John H. Strube

▶ The term "Data Processing" often creates a picture of a rather restricted service form of work, limited to a machine room or a specialized computer. Such a machine room is regarded as a supplement to but does not supplant information-handling operations as performed on a manual basis.

It is not easy to acquire a broad concept of over-all, functionally integrated, unified, simplified, and machine-oriented paperwork handling which encompasses all phases of a business. It is not easy to comprehend something one has not experienced. A purchasing executive, for example, even while adopting the most advanced forms of purchase order writing, including by-product tapes, is likely to organize the other areas of his section so as to continue essentially the various manual operations normally associated with purchasing. He may not even recognize the opportunities which exist to use by-product data for better measurement and control. And, what has been said about purchasing applies to almost any of the specialized functions of a business.

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Potential

Some of this misconception and lack of vision is understandable, considering that we are still in what might be termed a data processing "twilight" era. The potentialities of automated data processing are being explored within an atmosphere still teeming with old and proven manual methods. These manual methods have created subdivisions and fields of specialization which, in the light of progressive data processing and its potential, should be questioned but by their very nature make it difficult to do so.

The term "Integrated" is commonly used to modify the term "Data Processing." It indicates the possibilities which exist to interrelate the information handling requirements of one functional specialty with another. Linking the term Integrated Data Processing with source gathering media of a machine actuating type, such as tape or cards, tends to imply that this, in itself, constitutes the entire warp and woof of integrated data processing. It implies that unless elaborate machines are employed, the techniques are not being properly used. Terms such as "Automated Data Processing" and "Electronic Data Processing" lend emphasis to the machine aspects of the procedure as against broader organizational or management concepts.

Recognizing the limitations of terms such as "Integrated," "Automated," or "Electronic" Data Processing, so far as expressing over-all management concepts are concerned, let us consider RDP—RATIONAL DATA PROCESSING. RDP encompasses not only the idea of initially capturing data in a machine acceptable form, it also includes the use of any type of equipment which can be logically or profitably employed together with any and all other aids to processing data economically. But, it goes farther. It recognizes that basic to all this is a logical and proper *organizational* structure which will best utilize and to some extent is made possible by the newer data processing techniques. This structure is different from an organizational setup designed primarily for specialized functional compartments of an organization that are essentially operated manually. It is time to stop using modern engines with vehicles designed for the horse-drawn operations of yesteryear. We need to design new data processing "automobiles," from the tires up.

For example, consider a medium-sized business which made effective use of standard punch card equipment but which so integrated this comparatively simple technique into all phases of the business that outstanding results were achieved. The various officers and functional specialists of the business were located around the periphery of one large office working space which was entirely under the control of an office manager. It was his job to service all these specialists by getting them the data they needed in a form and manner best suited to team rather than individually and specialty oriented needs. There were no artificial barriers between functions and the small clerical force. Information processing flowed smoothly from engineering, to manufacturing, to marketing, to finance as the nature of the work load demanded. That is, this work force was business

oriented rather than functionally oriented. Effective use was being made of card procedures with the work force supplementing these routines as a team. It was easy to conceive of a computer being dropped into place (and by now it probably has been) without disturbing the basic organizational pattern. Their basic pattern was ready for it.

Participation

Another feature about this organization was that everyone was informed. Even the president understood the purpose of each routine. He understood how the routines tied together, what control data were being generated, and, although he could not have wired a punched card board, he had knowledge of procedural philosophy and of the basic functions of the machines so that he understood what could be expected from them. The other officers and specialists also thought constantly in terms of the business and of how they could contribute to the common purposes of the organization and to its over-all information processing procedure. There is probably a physical limit to the size of a business which could perform in this manner, but for *this* business the procedure just described was a logical, RATIONAL, type of data processing.

The importance of an *organizational* approach to data processing can be further emphasized by observing the increasing tendency of large companies to break up their centralized and functional organizations into complete processing divisions, usually built around a family of products. These become relatively self-contained as far as engineering, manufacturing, marketing, and finance are concerned.

Parkinson's Law says that "Executives make work for each other." When left to their own devices, as far as paperwork processing is concerned, he suggests, an organization can easily become fragmented into two, three, or even four almost separate, overlapping, and in some cases competing and hardly recognizable elements of the same organization.

Segmentation

Many procedural techniques such as Work Simplification, Work Distribution Charts, and Flow Charting have been developed to detect and to attempt to alleviate the results caused by basic organzational segmentation in paperwork processing. In all too many instances, however, the effort expended is lost because there is no incentive on the part of the functional supervisors, who are affected, to cooperate. In too many instances, the importance of a supervisor is determined by the size of his unit or the budget which he controls. Under these circumstances it takes a dedicated "company man" to agree to reduce his own status particularly if it may result in a reduction of his working force or in the consolidation of his unit with another. It would be interesting to take a poll of procedures men and get an objective expression about the effect of this point of view on organizational wholeness in their companies.

That this condition does not need to exist was demonstrated in a large decentralized assembly plant of a nationally known company. Here the local controller explained the features of a control plan (without notes) from the original entry of a dealer's order on a salesman's order blank, through all phases of order accumulation, production

component explosion, plant machine speeds, balanced work levels, purchase ordering techniques, and finished stock controls. It was a *whole* procedure. The amazing part of this was that while punched card equipment was intimately tied into the daily operations of the production phases of the plant, it was not used on some fairly standard procedures such as payroll. The reason given was that by staggering the pay data of the employees, it was possible to use a small payroll force which did not need the more expensive equipment. That is, RATIONAL type of data processing had been developed which had as its objective a most efficient over-all data processing plan for the entire plant. It was recognized and appreciated that paperwork processing is an integral part of the cost of the product being produced and should be so considered. It was recognized that the procedures should be tailored (rationalized) to meet the needs of the plant and not to build bigger inner departments for the sake of "departments." The main concern was to perform a data processing service rather than to operate a processing force.

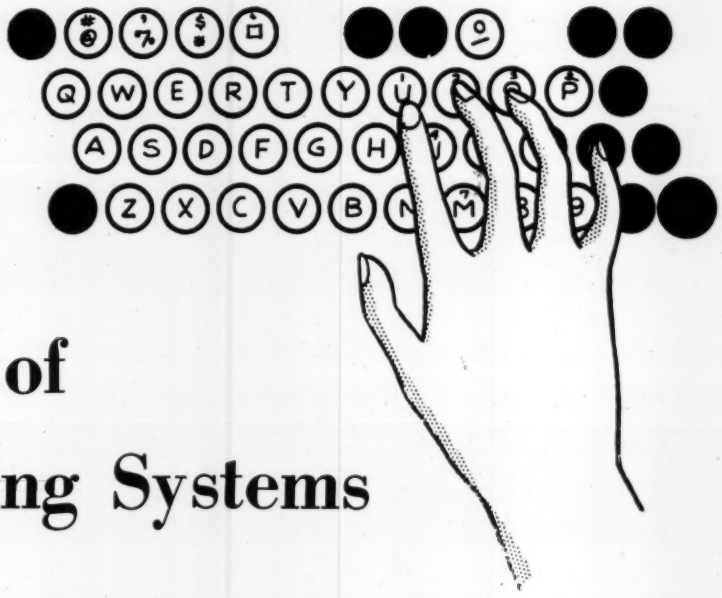
Rationalization

Expensive, specialized equipment need not be the hall-mark of a modern RATIONAL type of data processing. This was proven recently in an organization which had three separate and distinct customer servicing units because of the field and internal organization of its marketing setup. Having been on a manual basis but a short time before, each of the units vied with the others using equipment which captured the data at initiating points by use of pre-stored masters, a type of IDP, that required only the insertion of parameters and employed by-product tapes or cards for direct entry to punched card routines. Each unit by itself was a model of IDP progressiveness. Because of peak load conditions, it was frequently necessary to work overtime and serious consideration was given to the necessity of obtaining additional equipment. When the idea of an organizational consolidation of the separate units had finally been sold by the procedures group, it was possible to reassign two of the supervisors, to reduce the working force by a number of clerks, and to release specialized and expensive equipment in exchange for prosaic key punches which were equipped with some special devices to speed up card handling. But more important, overtime was eliminated and because of the simplicity of the routine, the operators even have time to assume other responsibilities.

The key to this whole program was the adaptation of logical, RATIONAL, data processing to the organizational whole rather than the application of new techniques to a compartmentalized, individual-centered organization.

There is, of course, no one best universal way to process data. There is no one best machine for processing. The basic requirement is a sympathetic understanding by the executives of a concern of the nature of data processing and their willingness to recognize and support the fact that the main need is systematically to provide a rational data processing service throughout a company rather than to operate a clerical force of inner specialists. Data processing must not be hampered by rigid outmoded organizational norms nor inflexible machine requirements. A company needs RATIONAL DATA PROCESSING. **s/p/a**

Donald R. Shaw



In Defense of Key Punching Systems

► Since the beginning of mechanical data processing, business machines companies have been producing devices which handle larger and larger amounts of data, faster, and more automatically. These machines, commonly used in clusters, have led to centralized data processing. In centralized installations, repetitive tasks can be done on a semi-automatic "assembly line" basis. It is not uncommon today to find a tabulating or electronic data processing department doing work on a routine basis for every single department in a company.

In the past, the source documents to be processed were sent from various originating departments to be key punched in the central processing area. Key punching proved to be a relatively inexpensive and easily verifiable means of entering information into a system. Lately, certain manufacturers of specialty input devices and some paper forms suppliers have ruled out key punch in favor of document originating machines which produce, as a by-product, cards and tapes as machine input for further processing. This is the "Integrated Data Processing" approach.

In IDP, one company edits incoming orders, pulls customer paper tapes and edge-punched item cards from a tub file, produces a shipping order on a tape punching typewriter, converts the output tape to conventional punched cards, uses the cards to *manually* post to a card inventory file, marks quantity shipped on the cards, and *then* sends the cards to the tabulating department for extension and customer invoicing. Is this really better than the older key punching system?

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Have we forgotten that a single tabulator can list 300 characters of data in one second, *thirty* times as fast as the fastest automatic typewriter; that a single collator can associate master cards carrying 80 to 90 characters of repetitive master information (with item cards key punched only with a three- to five-digit code) at better than 10,000 cards per hour? Has the systems profession forgotten that a modern punched-card-operated calculator can credit or debit inventory 100 times in a minute, all the while making millisecond decisions on back-ordering, routing, pricing, re-ordering, and what have you?

Compare Systems

General Merchandise Company in Milwaukee (a large mail order wholesaler) handles millions of inventory transactions yearly, affecting over 35,000 stock items, on a pre-billing basis using conventional punched card equipment. At the close of its latest yearly physical inventory, a $688 adjustment was required to bring physical and book inventories into balance. All the while, of course, completed documents were produced on tabulators that would have required the use of an army of typists or automatic typewriter operators. All this is being accomplished on a 100 per cent centralized basis, although the activity embraced occurs in seven different warehouses. Input is almost exclusively key punching.

Key punching and verifying is often still the cheapest, most accurate, and least troublesome way of entering data into a system. There are applications, however, where a printed document must be produced on a decentralized basis. Does it necessarily follow that producing a card or punched paper tape as a by-product is always better than bundling up a batch of carbon copies, sending them to the home office by mail, and having them key punched? In many cases, the cost of installing and maintaining electrical transmission systems may be many times the savings gained by faster entry. Speed may play an important part, but those who have experimented with wire or telephone transmission of data, at this early stage of the art, have discovered the headaches, inaccuracies, and expense of reconversion to punched cards at the receiving station. How often have these people wished for a good old "hard copy" from which to key punch and verify in order to eliminate fantastic transmission and/or conversion errors which are unseen and unedited until the actual processing is under way?

There are legitimate applications for IDP with proper safeguards and controls available. In some instances, it may possibly be the cheapest way to do a job. But are we carrying IDP to extremes when we manually create a document that could have been printed automatically, just to have a paper tape to convert, at high cost, into some after-the-fact document that would have been available anyway if we had done the whole job on tab equipment?

Compare Cost

Systems men should consider the cost of maintaining IDP equipment, of operating it, of handling tape files, of keeping tape files up-to-date without proper visual reference to them, of leasing wires, of running conversion equipment, and of correcting undetected translation and transmission errors before ruling out the use of familiar, verifiable, controllable, 10,000 strokes-per-hour key punching. A reasonably competent operator can key punch *and* verify approximately 500 full 80-column cards per day.

Allowing $15 per day for the cost of the operator and machine, this comes to around 3 cents per card. How else in business can a complete, double-checked, 80-character document be produced for 3 cents? And when the further economies of mechanically associating master information with such documents are considered, the cost per input character for the system further diminishes.

Let us say that a hypothetical 15-line invoice or shipping document consists of 40 characters per line, or 600 characters. It requires 300 digits of key punching and 300 are supplied from master cards or counters in a tabulating machine. The necessary key punching and key verifying would cost, using the figures of 3 cents per 80 characters, approximately 12 cents. The form itself is likely to cost between 5 and 15 cents. Consuming a tenth of a minute on a $900-per-month tabulator, adding generous allowances for peripheral equipment, operators, and overhead, machine processing would not cost in excess of 20 cents. Adding these figures together, we arrive at a possible cost of 52 cents per document, a nominal cost indeed. And only 1/4th of it is chargeable to key punching. In actual practice, costs both of processing and key punching may be considerably less, especially when spread to readily produced accounting and control reports.

The same document may be written on a tape-card-keyboard-actuated machine at a maximum rate of about 200 per day. The cost per document, allowing $15 per day for operator and machine, is at least 7 cents. Add the cost of manual extension, editing, and the look-up of master information and we have another 8 cents. Forms cost between 5 and 15 cents; total, about 23 cents. We now have a document and a punched tape or card. Inventory is still to be posted. The output media, if not to be converted, still needs to be processed and summarized before it can be used to write a final document. Add about 7 cents more.

Compare Results

We have, then, nearly *tripled* the cost of input into the system, added a decentralized master file of tapes or cards in which every change of address, price, discount, stock number, description, warehouse location, etc. *must* be reflected as soon as it occurs, and lost accounting and administrative control over the origination of the document. The main result is the production of an on-the-spot shipping order which has *not* been posted to inventory and which must later be corrected and used to correct the original input data before that data can be used.

The chief advantage of the non-IDP approach in this situation seems to lie in the ability to pre-bill. It may be that the example given here is "loaded" in favor of the centralized method by the assumption that pre-billing is possible. In a real situation this may not be the case. True, but in real situations it is rarely possible to produce the kind of document we have been talking about on an IDP basis for as little as has been assumed. Some IDP machines cost ten times as much as the assumed value in the example. Some tabulating machines cost less than the assumed figure.

Conclusion

In conclusion, let us observe that the advantages and disadvantages of each approach are relative to the particular application. Take a second look at key punching systems. The involvement of key punching should not be a cause for its elimination as an approach to data processing. The results are what count.

s/p/a

Peg Board Systems

Bert Schireson

► The article following is a discussion of the principal uses of one-time writing boards, a mechanical device for holding documents so that preparation, recording, posting and/or summarizing can be accomplished with one writing. They are generally referred to as "peg" boards because pegs are used to line up and hold the multiple copy forms in place during the writing.

Types of Peg Boards

There are three main types of peg boards: 1. Shingled forms, 2. Batch loaded forms, and 3. Individually inserted forms. The shingled forms look similar to the shingles on the roof of a house. On some boards, the original is shingled and the ledger sheet to be posted is individually inserted. The journal is prepared as a carbon copy.

Individually inserted forms are used when the accounts to be posted do not follow a definite sequence. The ledger sheets must then be individually placed on the pegs. Otherwise, they are batch loaded.

There are feature variations among different makes of boards. For example, using the shingled form, the clerk is required, on some boards, to change his writing position for each entry. On other boards, the writing position remains fixed. A special device moves the form itself. Usually the entire information regarding a transaction is placed on a single long line.

One manufacturer has developed a "board-less board" that can be inserted into a typewriter. Figure No. 1 illustrates a boardless special-purpose cash receipts form. The alignment of the forms was made by the printer with provision for a carbon copy which accumulates the data. Most of the boards and forms are quite inexpensive. Using standard forms, many applications can be started for less than $100.

Bert Schireson is the author of many articles on systems and accounting and is serving his third year as a member of The Systems Committee of The Los Angeles Chapter of The Californit Society of Certified Public Accountants. Mr. Schireson is in practice as a CPA and business consultant. He is a graduate of U.C.L.A.

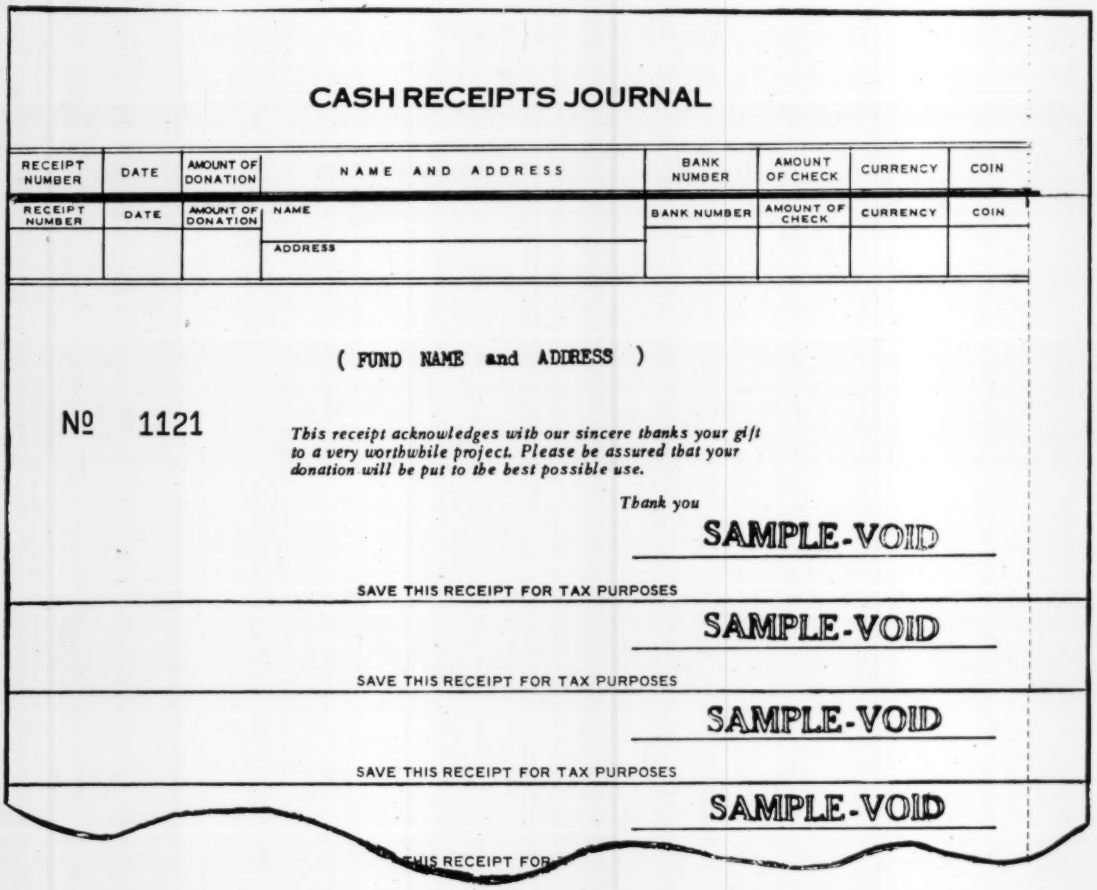


Figure 1

Payroll

The classical application of one-time writing boards is to payroll. The Payroll Journal illustrated in Figure No. 2 shows a place for gross payroll, deductions, and net payroll. As this information is written, a carbon copy may be produced of individual compensation records. Another carbon enables the same information to be produced on a payroll check record. When the payroll is completed, the check record is totaled and proved. Then, the body of the check is completed. As a final step the total of the checks is compared with the total of the net payroll.

Since there are so many figures associated with each payment, the simultaneous entering on the check record and posting to the individual compensation record is an outstanding saving in clerical time. It also eliminates errors that result from recopying.

Accounts Receivable

The accounts receivable application (Figure No. 3) illustrates posting to a detail ledger from essentially two books of original entry. At the same time that a sales invoice is entered in the sales record, it is posted to accounts receivable and the customer's statement is prepared. Usually the customer's statement is the original, the accounts receivable ledger sheet is the first carbon copy and the sales journal is the second carbon copy. A different column of the journal can then be used to record the cash receipts.

Actually there are many variations possible. One is to use two separate journals and accounting boards with one accounts receivable ledger. Another variation is to create a cash-received slip instead of a statement of the account receivable.

Voucher Check

A voucher check (See Figure No. 4) does not involve any posting. The voucher portion of the check is prepared in duplicate as the suppliers' invoices are received. Issuing the check is a separate operation and using the board makes it possible to prepare a check record simultaneously. Here again there are many variations from a conventional accounts payable to a direct payment plan.

Where there are different distributions from an invoice or check record, unit distribution slips are advisable. Rather than go through the labor of entering the items on a large columnar pad, a carbon copy of each entry is made on a distribution ticket (See Figure No. 5). The tickets can later be sorted and totaled by account number.

Sales Invoice

The sales invoice is a pre-printed form (See Figure No. 6) with the same alignment of rows used to summarize each day's business. These forms are placed on a peg board or peg bar where monthly totals by product can be accumulated. A clerk merely places a ruler on the invoices and adds across. This is a great time saver.

This approach to summarization is called strip accounting. It is especially adaptable to sales summaries where there are relatively few kinds of products sold.

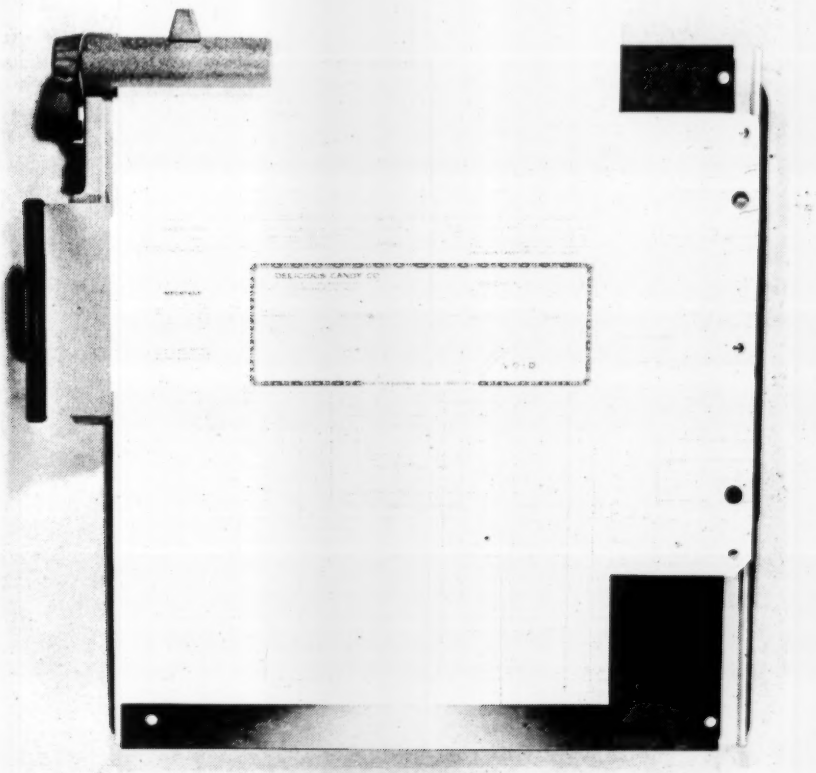


Figure 2

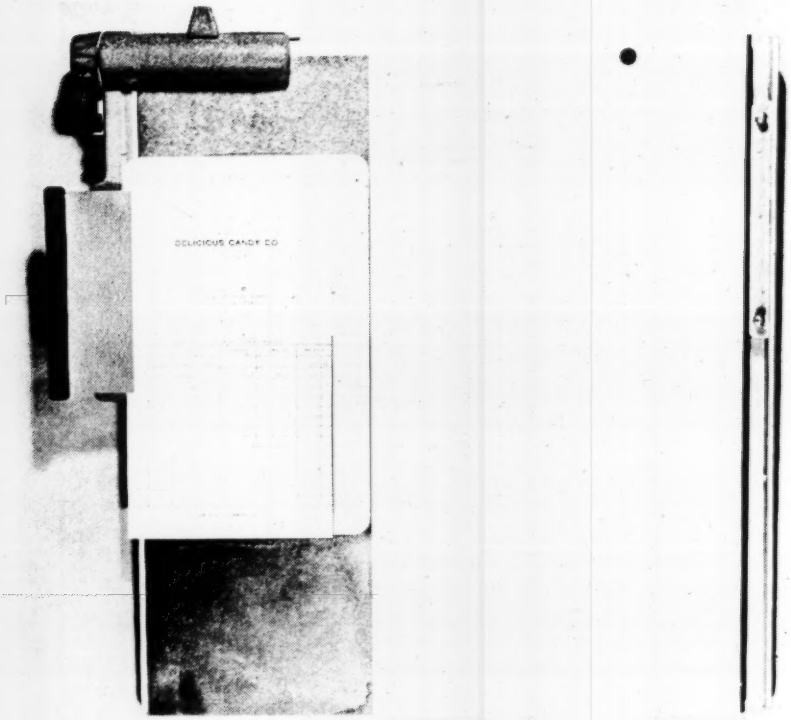


Figure 3

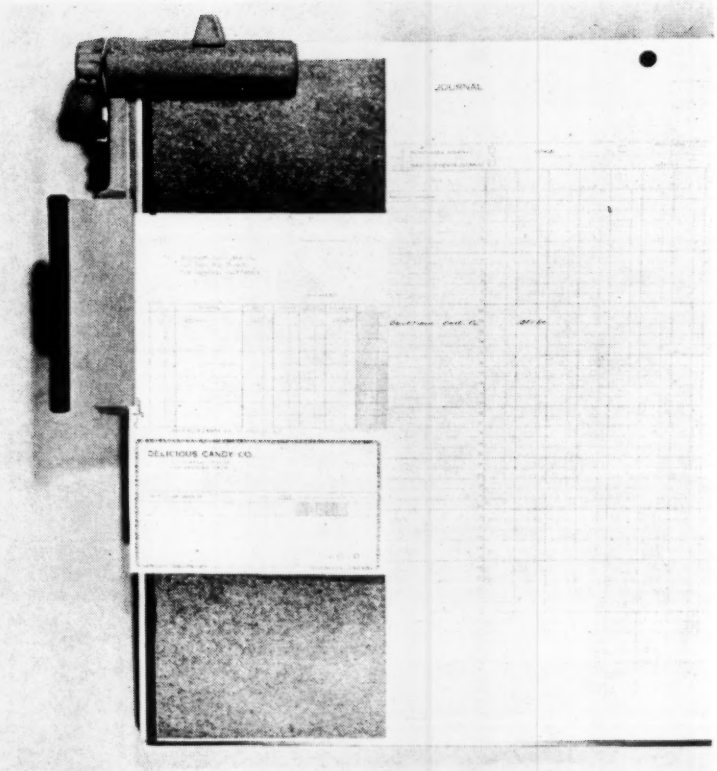
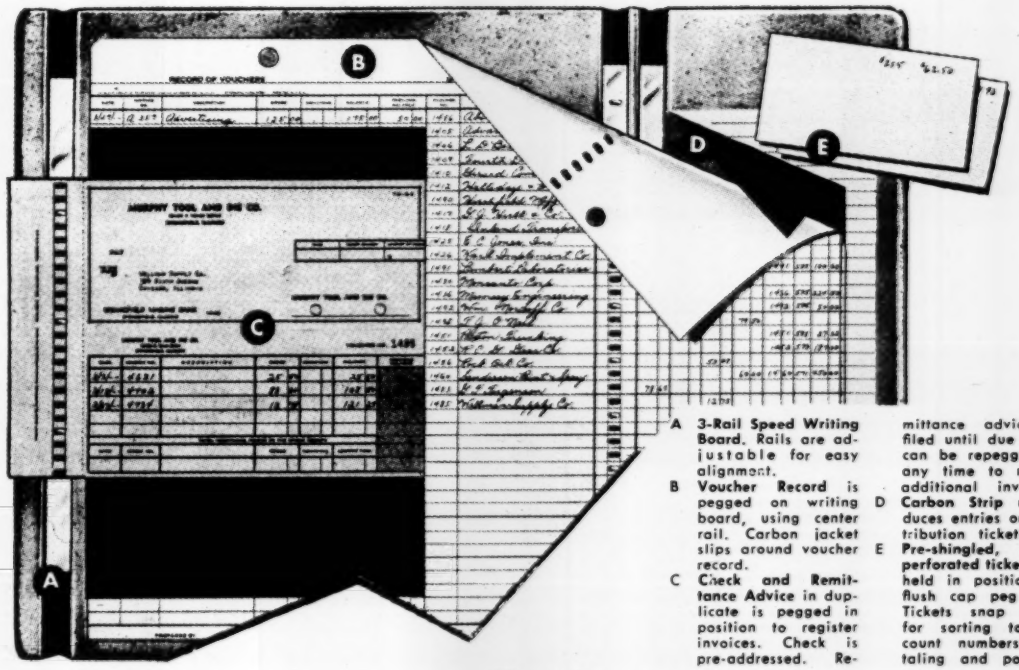


Figure 4



A **3-Rail Speed Writing Board.** Rails are adjustable for easy alignment.

B **Voucher Record** is pegged on writing board, using center rail. Carbon jacket slips around voucher record.

C **Check and Remittance Advice** in duplicate is pegged in position to register invoices. Check is pre-addressed. Remittance advice is filed until due date; can be repegged at any time to record additional invoices.

D **Carbon Strip** reproduces entries on distribution tickets.

E **Pre-shingled, snap perforated tickets** are held in position by flush cap peg rail. Tickets snap apart for sorting to account numbers, totaling and posting.

Figure 5

SOLD TO _____

DELICIOUS CANDY CO.
123 SUGAR CANYON DRIVE
LOS ANGELES, CALIF.

DATE _____

QUANT. ORDERED	DESCRIPTION	QUANT. SHIPPED	PRICE	AMOUNT
	1 lb. Assortment		.66	
	1 lb. Assortment - all dark		.66	
	1 lb. Assortment - all milk		.66	
	2 lb. Assortment		1.32	
	2 lb. Assortment - all dark		1.32	
	2 lb. Assortment - all milk		1.32	
	1 lb. Creams		.66	
	1 lb. Creams - all dark		.66	
	1 lb. Creams - all milk		.66	

Figure 6

Income Statements

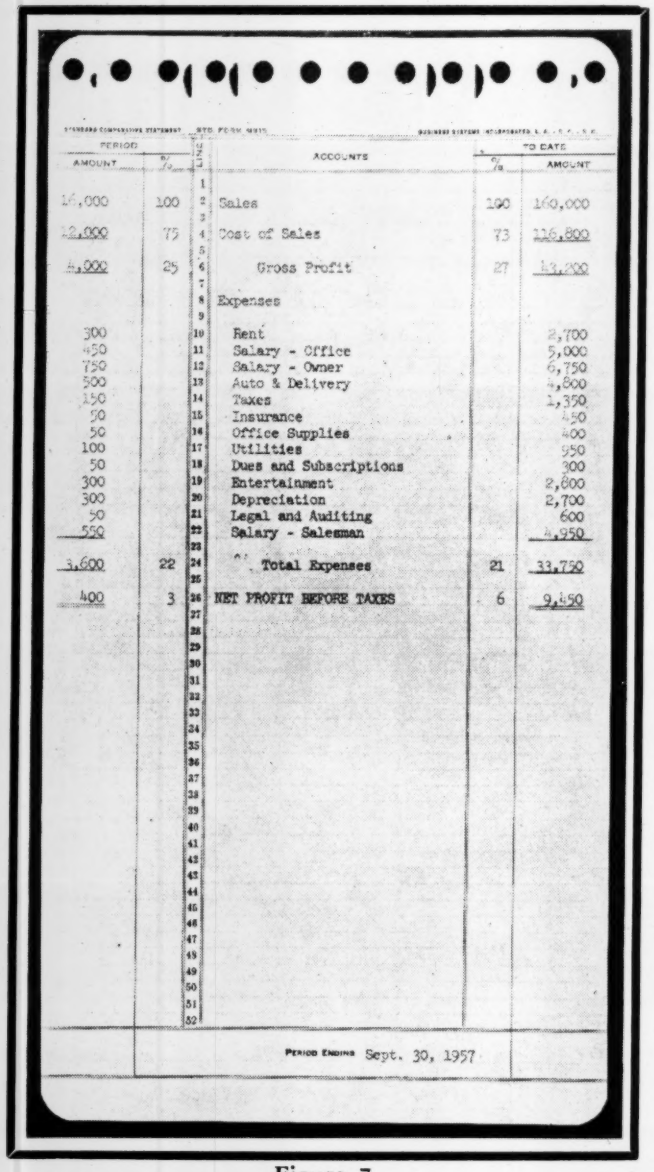
Income statements on strips facilitate comparisons.

By using the same form for all income statements (See Figure No. 7), monthly comparisons can readily be made on a peg board. The board maintains physical alignment so that any item can easily be compared with that of the previous months.

There are various types of binders that can be used with such strips. One of the most ingenious is a binder with metal links that enable the strips to fan out for comparison and to contract for restoring to the file (See Figure No. 8).

Pros and Cons

The question naturally arises as to when to use peg boards. The answer will depend on the volume of transactions.



PERIOD AMOUNT	PERIOD %		ACCOUNTS	TO DATE %	TO DATE AMOUNT
		1			
16,000	100	2	Sales	100	160,000
		3			
12,000	75	4	Cost of Sales	73	116,800
		5			
4,000	25	6	Gross Profit	27	43,200
		7			
		8	Expenses		
		9			
300		10	Rent		2,700
450		11	Salary - Office		5,000
750		12	Salary - Owner		6,750
500		13	Auto & Delivery		4,800
150		14	Taxes		1,350
50		15	Insurance		450
50		16	Office Supplies		400
100		17	Utilities		950
50		18	Dues and Subscriptions		300
300		19	Entertainment		2,800
300		20	Depreciation		2,700
50		21	Legal and Auditing		600
550		22	Salary - Salesman		4,950
		23			
3,600	22	24	Total Expenses	21	33,750
		25			
400	3	26	NET PROFIT BEFORE TAXES	6	9,450
		27			
		28			
		29			
		30			
		31			
		32			

PERIOD ENDING Sept. 30, 1957

Figure 7

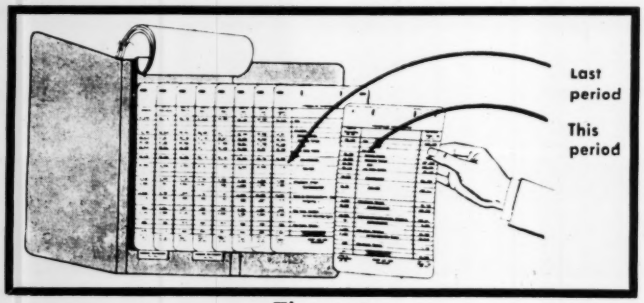


Figure 8

Actually peg boards occupy a middle ground between bookkeeping machines and a completely "old-fashioned" manual method.

In starting a new operation it is often prudent to start with conventional manual forms. Then as the volume increases and the pattern of work stabilizes, the peg board should be considered.

For payroll, one should start considering a board when there are 15 to 20 employees. When there are 150 or so, a bookkeeping machine is more satisfactory. A more exact criterion than this would require a time and cost study.

There are many special uses for peg boards. They are especially adaptable to branch offices where a duplicate record must be prepared for the home office. The chief advantages of a peg board is to save time. As long as paper is cheaper than labor, peg boards have their place in paper work systems. Time is saved through simultaneous entry and posting. The proving of one operation automatically proves the additional operations resulting from carbon paper. When the original posting is done currently and accurately, all the records are current and accurate.

The appearance of a hand-written form is a disadvantage in some applications. Sometimes the appearance of a carbon copy is poor, but this can be easily overcome with a good carbon paper or thinner forms.

In recording a transaction on a peg board, the board has to be set up or loaded. As a consequence the initial recording may take a little longer than an individual handling. However, the slight time loss at this stage is more than made up in the over-all situation. **s/p/a**

Business Organization and Management, *by Elmore Peterson and E. Grosvenor Plowman; Richard D. Irwin, Inc., Homewood, Illinois, 1958, $8.40.*

In its fourth edition, this book is a fundamental source of education and information on organization and management. Although one may already be familiar with the principles of organization, this book refreshes the memory and brings you up to date.

Among the eighteen chapters are basic ones, as "The Principles of Authority, Responsibility, and Accountability," "The Executive Level of Management," and "Line, Staff, and Functional Organization." Several chapters, not very common in books on this subject, are "Management of Association and Mutualized Enterprises," "The Management of Government Proprietary Enterprises," and "Management as a Career."

The principles outlined in each chapter are easy to follow and understand. The authors conclude the chapters with selected references, projects, and problems. While essentially a textbook on the subject, its comprehensiveness makes it a desirable one for the bookshelf of anyone involved in organization work or management problems. It is particularly adaptable for executive training. The book is adequately illustrated with charts, statistical data, and graphs.

In the chapter, "Efficiency and Automation," the authors state that, "Efficiency is the quality of effectiveness, competence, and capability in productivity. Efficient operation of a business means good management and adequate performance of work, in combination. Efficiency is a fundamental concept in the whole management process." While it is commendable on the part of the authors to be defining "efficiency" in terms of the organization as a whole and its satisfactory operation for the stockholders, employees, and even customers, it is still "dangerous" to be using this word too freely in view of its early connotations. *(Reviewed by Victor Lazzaro.)*

The Administrative Process, *by Robert H. Roy; The Johns Hopkins Press, Homewood, Baltimore 18, 236 pp., 1958, $5.00.*

The problem of establishing a basis of communication and understanding between academic people on the one hand, and businessmen, on the other is not new. The perennial "up in the clouds" professor who cannot get through to the "down-to-earth" systems analyst, and vice versa, is well known. For years management has sought ways in which the barriers separating these groups could be overcome and their differences in viewpoint reconciled.

This communication problem is well illustrated by Robert H. Roy's new book,

The Administrative Process. Dean Roy's forthright attempt at bridging this gap has been made, and one wishes he had succeeded to a greater degree. Dean Roy writes clearly and succinctly but what he says is of general interest rather than of specific value to the systems man. Therein lies his lack of success.

The achievements of the author, however, are many and well presented. His analysis and observations of the staff relationship is well worth the systems man's time and study. The chapter dealing with planning is especially interesting in light of the recent interest managements have placed on the subject due to the business recession.

The Administrative Process is further enhanced by the author's ability to summarize each chapter without repetition or excess verbiage.

Summary: Worth reading for the academic viewpoint and some interesting new ideas. *(Reviewed by Tom Rizzo.)*

Management and Organization, *by Louis A. Allen; McGraw-Hill Book Co., Inc., 330 W. 42nd Street, New York 36, 353 pp., 1958, $7.00.*

Some of the questions answered in this easy-to-understand analysis of management and organization that every systems man would be interested in are: What are some misconceptions about management that cause an organization to suffer? What is the true nature of management? Why have some organizations outgrown their structures? How does an organization know when it should change its structure to ensure sound growth?

Without dwelling on theoretical ideas, Mr. Allen draws from his management consulting experience to bring facts to the reader that help him to solve his organizational or management problems. Actual case studies of such corporations as Du Pont, General Motors, Sylvania Electric Products, Inc., and dozens of others, follow almost every principle the author develops. In fact, the concepts presented in the book are based on a first-hand study and investigation of 230 leading companies.

Mr. Allen begins by blasting common assumptions made about the actual *work* of managers. He explains how we know when a manager is *managing* and when he is not. He goes a step further and describes how we know when a manager is managing properly and when he is not.

Although "Few managements are ever confronted with the need to organize from scratch," reorganization is a job that is always at hand for most businesses. If my annual sales volume is $25 million and my firm is growing, are some drastic changes necessary in the framework of my business? Such a question is answered in Part Two. In this Part also, Mr. Allen describes three kinds of organizational structures and how they are built up. He tells us from his experience what one of the most general causes of failure in organization is. He relates to us the experience of big executives who have tried to solve their overwork problems by hiring a personal staff. He tells us what kind of organization the victory will go to in a competitive economy. He gives us a key word to successful organization, and he outlines how we can do a better job organizationally.

In saying "Inevitably, the form of organization which tends to encourage strong and dynamic individualism gives way to forms which foster teamwork and cooperative effort," Mr. Lewis states a main thesis of the book.

As a panoramic overview of successful management and organization, this book

will serve as a magnifying glass for one who wants a closer look at his organization. The book itself is a lesson in good organization — easy to review quickly because of its logical outline presentation; deep enough to give the reader insight to his most serious organizational and management perplexities. *(Reviewed by Jeffrey R. Stewart, Virginia Polytechnic Institute.)*

Cost Control through Electronic Data Processing, *by Phil Carroll; Society for Advancement of Management, 74 Fifth Avenue, New York, 32 pp., 1958, $1.50.*

This monograph provides a non-technical coverage of the many management problems which lend themselves to the use of electronic data processing equipment. Mr. Carroll has done what seems to this reviewer to be an excellent job of placing in reasonable perspective the impressive capabilities of new electronic data processors. Writing in an interesting style, using many concise illustrations from his business experience, he warns against the pitfalls of the use of such equipment while at the same time pointing out the areas of management for which the equipment may be of great value.

The scope of this monograph is perhaps broader than its title implies. In addition to treating the typically cost control techniques of flexible budgets and standard costs, Carroll deals with sales forecasting, sales incentives, product mix, production scheduling, and inventory control problems. By so doing he rounds out a broad coverage which might be considered generally the *planning and control of profits.*

Carroll emphasizes the importance of distinguishing between "systems" and "people" in recognizing the limitations of electronic data processing. He points out that the equipment does not in any way substitute for skilled decision-making and prompt action. As Carroll states it, electronic computers "turn out answers faster than anything we have ever known before. For these answers to be of value, the manager must first ask the right questions. Then, more importantly, he must take the constructive actions indicated by the answers he gets."

Business managers, engineers, statisticians, accountants, and all who deal with quantitative data for business should find this monograph interesting and useful. For some it may point out areas of application of electronic data processing equipment which they have not yet explored. It may assist others in guarding against the pitfalls of misinformation or of expecting too much from this impressive tool. *(Reviewed by R. Lee Brummet, Ph.D., C.P.A., University of Michigan.)*

High-Speed Data Processing, *by C. C. Gotleib and J. N. P. Hume; McGraw-Hill Co. Canada Ltd., Toronto, 338 pp., 1958, $10.95.*

This book sets out concisely and logically the operational principles of high-speed data processing and includes references to such applied techniques as Operations Research. The text is complex, containing many mathematical formulae and references not readily understandable by the average businessman. While involved, it is, nevertheless, a useful contribution to the field.

The book presents a logical development of data processing, covering the basic principles underlying the operation of electronic computers for commercial purposes. The chapters "Analyzing," "Programming," and "Coding" are particularly clear.

The authors, in their treatment of the subject, reveal an unusual understanding

of business problems. Individual accounting and commercial applications are illustrated in the broadest terms.

It seems probable that this book will appeal to those with a keen interest and appreciation of what electronic data processing has to offer. *(Reviewed by C. H. Cowperthwaite, C. A., Toronto, Ont.)*

Installing Electronic Data Processing Systems, *by Richard G. Canning; John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, 193 pp., 1958, $6.00.*

While this book has been prepared mainly as a guide for the installation and preparation for electronic processing machines, it also gives an excellent over-all picture of what to expect if one is contemplating ordering such equipment. Actually, the real problems of EDPM begin after the order is placed. These problems can be more fully appreciated and be less burdensome after reading this book.

The chapters cover such subjects as Organizing the Over-all Program, the Systems Plans, General Programming, Installation, Conversion, and Operation. Many charts and illustrations are used to supplement the text. Case histories are used where possible to amplify what, up until recently, has been theory.

One Appendix covers the all important "Human Side of Electronics," by Wesley S. Bagby, while another Appendix describes the Characteristics of EDPM Personnel.

This book is well worth reading for anyone contemplating or in the early stages of EDPM. *(Reviewed by Victor Lazzaro.)*

Assessing Managerial Potential, *by Foundation for Research on Human Behavior, 1141 East Catherine Street, Ann Arbor, Michigan, 1958, $3.00.*

A report of a seminar conducted by the Foundation for Research on Human Behavior, Ann Arbor, Michigan, it is of particular interest to businessmen because it brings under one cover critical descriptions of both the standard and experimental methods which have been developed for use with executives. These methods were discussed at two seminars which businessmen and social scientists held to explore the field. The report also contains some of the results which specific businesses have achieved: the strengths and the weaknesses of particular methods, when used singly and in combination. *Assessing Managerial Potential* will provide businessmen with new insight into the constant problem of finding and building executive leadership. *(Reviewed by Michigan Business Review.)*

Cases on Human Relations in Management, *by Richard P. Calhoon, William E. Noland, and Arthur M. Whitehall, Jr.; McGraw-Hill Book Co., Inc., New York 36, 439 pp., 1958, $6.00.*

This book is a collection of 75 well-written case situations which depict a variety of interpersonal problems encountered in organizational settings. These settings include the general management group and such departments as marketing, production, personnel, and accounting.

The cases reflect the disciplines and interests of the authors in administrative philosophies, communications, formal and informal organization, the individual's personality, and his adjustment to the group in which he works. They are taken from manufacturing as well as non-manufacturing industries, and are the result of extensive field research from 1954 to 1957. *(Reviewed by Michigan Business Review.)* **s/p/a**

Worth Reading

"Automation and Accounting," C. L. Keenoy, *The Accounting Review,* April, 1958, pages 230-236.

The potentialities of the "Sales-Tronic" automatic data processing system in retailing are discussed. A sensing device reads information on pre-punched price tags and charge tokens and then translates the information to a punched tape.

"Why Do Double Work?," Kettner Gadebusch, *American Business,* May, 1958.

Describes an integrated accounts receivable system used by F. Schumacher and Co., (New York City), a fabric supplier with 30,000 accounts. Tapes are punched as a by-product of posting to customer statements by accounting machines. The tapes are then converted to punched cards for completion of the accounting operations.

"Flow Chart Your Systems Problems," Walter S. Athearn, *American Business,* June, 1958.

Brief illustrated explanation of how to flow chart a complex system. The horizontal sequence method developed by Standard Register is used.

"Quality in Higher Education," John W. Gardner, *Beta Gamma Sigma Exchange,* Spring, 1958.

In one of the most balanced discussions of education in the vast outpouring of literature that has appeared since Russian advances in education have been revealed to the world, Mr. Gardner calls for maximum development of individual potentials at all levels; a graduation of developed skills from the most humble to the most exalted activity. "Excellence is where you find it," he says. "There may be excellent plumbers . . . . An excellent plumber is infinitely more admirable than an incompetent philosopher. The society which scorns excellence in plumbing because plumbing is a humble activity and tolerates shoddiness in philosophy because it is an exalted activity will have neither good plumbing nor good philosophy. Neither its pipes nor its theories will hold water . . . . " The moral for systems is clear: to strive to the limit of our capacity for excellence in the performance of all our duties in terms of the objectives we set for ourselves and our profession.

"Cost Control Through EDP," R. A. Graeca, *The Controller,* July, 1958.

Summary explanation of cost reports obtained from a Univac installation in the Erie Resistor Corporation. The following basic cost records are run as a by-product of processing labor cards for payroll:

Daily excess cost report, weekly production ability report, labor distribution, and manufacturing control report.

"Financial Management for an Electronic Age," Wilson F. Seney, *Dun's Review and Modern Industry,* February, 1958, page 41.

As machines take over the drudgery of analysis and problem solving, executives have the opportunity to concentrate on tasks that can be performed only by men and not machines. It they pursue their opportunities intelligently, perhaps credit

will go to electronics for improving management practice as well as data processing techniques.

In the past, the important contributions of executives have been non-mechanical and non-electronic. In the future, executives will continue to be valuable to business for the same basic reason as in the past: managerial ability. A manager's success results largely from a grasp of several basic concepts:

1. Knowing what the real job of a top manager is.
2. Knowing how to make positive contributions.
3. Knowing how to work as a member of the management team.
4. Using good judgment in providing needed information.
5. Organizing his end of the business.

"Parkinson's Law," C. Northcote Parkinson, *The Management Review*, February, 1958, page 14.

"Parkinson's Law" recognizes the fact that work expands so as to fill the time available for its completion. "Thus," says Parkinson by way of illustration, "an elderly lady of leisure can spend the entire day in writing and dispatching a postcard to her niece . . . . " Parkinson's Law may be represented by two axiomatic statements: 1. An official wants to multiply subordinates, not rivals. 2. Officials make work for each other.

"Pinpoint High Sellers for Lower Inventory Costs," J. C. Finnigan, *Modern Office Procedures*, July, 1958.

A west coast Division of Owens-Corning Fiberglas found warehousing and inventory cost too high — 30 percent of inventory value. They took the following steps:

1. Determined fast moving, slow moving, and obsolete items.
2. Assigned turnover rates and reorder limits.
3. Adopted a visible index posting system.
4. Established control reports.

Inventory investment was reduced by 40 percent and turnover boosted to five times a year.

"How to Buy Paper," Charles A. Hill, *Modern Office Procedures*, August, 1958; **"How to Select the Right Carbon Paper,"** June, 1958.

Descriptions of the paper field for systems people — with definitions and nomagrams.

"Will Money Go Out of Style?" Warren C. Stevens, *Modern Office Procedures*, July, 1958.

Describes a system (devised by Designers for Industry, Cleveland) to eliminate cash payments. It is based on a wallet-size electronic pocketbook card which will record amounts "on deposit." Transactions with vending machines will be suggested by the card and the amount of the sale will be deducted from its balance.

"Record Room — Wastebasket or Data Center?", *Modern Office Procedures*, July, 1958.

Detailed illustrated description of Ohio Oil Company's record management system.

"New Billing Method.... For Control," *Modern Office Procedures*, August, 1958.

Describes the IDP billing system which replaced a manual system when invoices reached 1,600 a day in a west coast clothing manufacturing concern. A computer-

typewriter (punched tape) punched-cards system was installed in five branch offices and at the home office. The branches bill directly and furnish a tape to the home office where cards are prepared automatically. Seven billing personnel are now required in place of eleven formerly used.

"Operations Research and Synthesis for Understanding Your Business Better," R. A. Duff, *NAA Bulletin,* June, 1958.

Identifies three types of operations research:

1. Special mathematical techniques applied to individual problems.
2. Research on methodologies to use in solving a particular problem.
3. Research on understanding the "whole" of a business operation — synthesizing information about the business.

An illustration of the third type is given. It concerns a shop operating as a quasi-custom job shop. Total items sold bulked several hundred thousand but the most popular averaged only a few hundred a month. There was no apparent pattern. Analysis, however, revealed that subassemblies were used in patterns. This resulted in a change from stocking parts to stocking subassemblies which, in turn, made it possible to ship orders in three days instead of seven weeks.

"How We Integrated the Purchasing-Receiving Operation," Frederick W. Malloy, *NAA Bulletin,* June, 1958.

Detailed description of General Aniline's (Anso Division) purchase order-receiving report integration. Ansco writes 24,000 purchase orders and 30,000 receiving reports annually. Over 90 per cent of their orders are filled in one to three shipments. There is one purchasing department and two receiving stations. One part of the seven-part purchase order form is illustrated.

"Integrating Data Processing With Electronic Equipment," *NAA Bulletin,* May, 1958.

The entire issue is devoted to integrated data processing. Includes articles on orientation, feasibility studies, and application problems.

"Caloric's Perpetual Inventory System," Werner N. Davidson, *The Office,* July, 1958.

Illustrated description of Caloric Appliance's inventory system maintained on NCR machines. Basic forms illustrated are: Inventory Record Card, Purchasing Advice, and Traveling Requisition.

"How Much Time Must You Save to Justify Cost of New Equipment?" *The Office,* July, 1958.

Presents a nomagram of the number of minutes per day at various salary levels which must be saved to warrant buying equipment of various costs. It is based on depreciation of 10 percent annually. Conversion factors are provided for other depreciation rates.

"Is the Paper Monster Devouring Your Profits?", Alfred H. Dorstewitz, *Office Executive,* June, 1958.

General introduction to the importance of a records management program.

"Improving Customer Service by Use of IDP," Edgar E. Wolfe, *Office Executive,* July, 1958.

Describes a Flexowriter, Computyper, punched card system for order and invoices. About 600 accounts and 1,100

items are included. An average of 75 orders and 100 invoices are processed daily. Claims a 50 percent increase in capacity with fewer personnel.

"Integrated Paperwork Control Speeds Replacement of Aircraft Parts," A. G. Mackey, *Office Management,* August, 1958.

Describes American Airlines' system for control of 120,000 replacement parts annually. A replacement request is teletyped to a supply base. The receiving teletype prints the message on a form which is then used as the shipping memo. At the same time, a tape is prepared which is later used to create punched cards for analysis of repair parts.

"Are Methods Men Responsible for Many of Their Own Current Troubles?" Charles Saunders-White and David R. Bywaters, *Office Management,* June, 1958.

Suggests that methods departments be viewed as a cost center with annual profit and loss statements. A methods department's work is divided into two main areas, and each is accounted for differently. One area, normal forms and systems maintenance, is viewed as direct overhead of the company and is not to be charged against income. The other area is improvement of existing systems, not in response to a management request. This area is considered to be "profit-making." Sample operating statements are included.

"How a Change in Purchase Order Form Simplified Inventory Control," *Office Management,* June, 1958.

A wholesale drug company uses a three-part carbon interleaved form for ordering supplies. It is usually handwritten. Stock clerks are authorized to issue the orders. The order copy is printed on postcard stock with mailing information on the reverse side. Of the remaining two copies, one serves as a record of the order, and the other is used as a check-off by the receiving department. The form can also be used as a request for a quotation.

The Office Machine Guide, a new quarterly publication (9½x6¼, about 50 pages to an issue, punched for a loose-leaf binder) covers a wide range of office equipment. Well illustrated, it is published by the International Office Machines Research Inc., Marnixstraat 419, Amsterdam-C Netherlands. Subscription rate in American currency $6. The coverage is international.

Publications referred to above are published as follows:

1. *The Accounting Review,* American Accounting Association (R. C. Cox, College of Commerce, Ohio State University, Columbus 10, Ohio).
2. *American Business,* Dartnell Publications, Inc., 4660 Ravenswood Ave., Chicago 40, Illinois.
3. *Beta Gamma Sigma Exchange,* 148 Hanna Hall, University of Cincinnati, Cincinnati, Ohio.
4. *The Controller,* Journal of the Controllers Institute of America, 1 East 42nd St., New York 17, N. Y.
5. *Dun's Review and Modern Industry,* Dun and Bradstreet, Inc., 99 Church St., New York 8, N. Y.
6. *The Management Review,* American Management Association, 330 West 42nd St., New York 36, N.Y.
7. *Modern Office Procedures,* Irving B. Hexter, 812 Huron Road, Cleveland, Ohio.
8. *NAA Bulletin,* National Association of Accountants, 505 Park Avenue, New York 22, New York.
9. *The Office,* Office Publications Co., 232 Madison Avenue, New York 16, N. Y.
10. *Office Executive,* Journal of the National Office Management Association, Willow Grove, Pa.
11. *Office Management,* Geyer - McAllister Publications, 212 Fifth Avenue, New York 10, N. Y.

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January 1948 (Vol. 1 No. 1) — November 1958 (Vol. 9 No. 4)

Compiled by Eleanor Maliche, Ph.D.

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Sacred Cows

One of the major hazards to systems traffic is the "sacred cow." Sacred cows are things, ideas, or ways of doing things which are invested with such tradition and publicity that to question them in any way is precarious if not actually sacriligious. We find many of these beasts serenely chewing cud in the clerical barns we enter in our everyday work.

Established practices, particular forms, personal foible turned procedure — we find them all. We hardly need to talk of these when we are already so professionally familiar with them. We wonder though, if when we return to our own barns after viewing other people's holy cattle all day, *we* might not find a few hidden away in our own practices and attitudes.

We, by definition, are acolytes at the altar of improvement; of change. Our definition of a sacred cow includes anything which is not subject to critical examination. If the programs that we want to sell to our managements are not critically examined, then they are Sacred Cows.

Systems and Procedures is a field full of competitive selling just like any other field. So, trade-marks and good catch phrases full of sales value become important. After all, a systems man can't just hire a skywriter to plaster the heavens with "Joe Schlunk is the best damn methods man there is." It might not be true, it certainly isn't dignified, and what would one do without his dignity to stand upon? So Joe Schlunk takes the only course open to him. He selects a trademark and tries to publicize it through magazine articles in the appropriate journals, books, and speeches.

Recently we talked to an exponent of Records Management and it was soon evident that Records Management to him meant the total methods function as systems men think of it. Another expert called the methods function *Work Measurement*. Work Simplification and Forms Control can be just as broadly defined. Other examples of magic sales labels are Executive Development, Management Reporting, Organization Planning, Scientific Management, Automation, EDP, IDP, and Operations Research. *So it seems we can enter by a dozen doors, but we always end up in the same old ballroom.*

It is important that we do not clutter up our profession with too many labels and tools. Many of the labels just named are within the legitimate bailiwick of the systems field, but we are in danger of weakening our profession and of losing our effectiveness if we look upon each as a new profession rather than as a tool or aspect of our own. Let us maintain a clear distinction between fundamentals and shibboleths. (James E. Myers, Past President, Detroit Chapter). **s/p/a**

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